REMARKS

The present invention provides a picture decoding method and apparatus and enables the extraction of filtering application information from a digital bitstream which enables an indication, on a frame by frame or picture by picture basis, of which one of a decoded pictures before the filtering process and a decoded picture after the filtering process, is to be output for a display purpose.

Additionally, the decoded picture after the filtering process is stored as a reference picture in a memory, and then output as the decoded picture before the filtering process in those cases where the decoded picture is a reference picture and the filtering application information indicates that the decoded picture before the filtering process is the desired picture for displaying purposes.

As can be appreciated, the present invention is in a crowded art yet still enables new editing capabilities to be provided in a convenient manner to an editor so that restrictions on reference pictures or a usage of reference pictures in accordance with filtering application information can be efficiently processed.

As one example, in desired certain visual presentations of a movie, it is sometimes desirable to provide a particular look, feel or quality to an image, that an editor may wish to convey relative to a scene or even a time period that is depicted in a story presented by the film, for example, a grainy appearance to indicate a time period in the late 1930's. Generally, film grains do appear in the processed images in a granular form, and are usually removed through a refiltering process.

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The present invention provides a method of utilizing a series of predetermined restrictions to make it possible, for example, to leave the film grains in a picture scene for artistic effects at the option of the editor.

Additionally, our present invention improves the coding efficiency of a data bitstream, irrespective of whether the film grains are to be left in the final picture. Our picture decoding method is adapted to a local decoding within a coding apparatus which generates a bitstream. Since the filter decoded pictures, for example without film grains, are stored in a memory as reference pictures, it is also possible to improve the coding efficiency.

The Office Action rejected previous Claims 18-25 as being completely anticipated by applicant's disclosure as Applicant's Admitted Prior Art (AAPA) of Figures 17-25.

The Office Action contended that the AAPA could be interpreted to include filtering application information for indicating a picture for an intra or inter frame. More specifically, that the filtering application information could indicate for a particular picture (e.g. intra) and each picture following the predetermined picture (e.g. inter) a decoded picture prior to the filtering process or that the filtering picture is preferred to be output for the display purposes, citing Figure 17.

As the Examiner is aware, compression techniques are utilized for compiling and storing motion picture data in a compressed manner. This is accomplished by determining which of the bits of data are redundant over a series of pictures or a video sequence. Thus, a predictive image is obtained by performing motion estimation and motion compensation on a block by block basis so that only the differential between the obtained predictive image and a current block needs to be coded. The decoding reverses the procedure and has frequently experienced so called "block noise" that can appear in the decoded picture as a result of the compression artifacts.

Figures 17-25 defined a conventional approach to solve a block noise problem by the use

of a loop filter shown as element 512 in Figure 17. As noted in the Office Action, an inter-

picture and an intra-picture prediction unit is utilized for determining both motion information

and intra-picture prediction mode information. Figure 22 discloses a memory management

flowchart for storing and outputting pictures in the memory 501.

As noted, however, on Page 8, Lines 24-32 of our specification, this prior art approach is

subject to problems under certain circumstances as follows:

> However, the related art has contained a problem of degrading the quality
> unique to films produced as film grains, when the material of pictures is
> film. This is because the film grains, appearing in a picture signal as a
> special signal component which has few spatio-temporal correlations
> between the pictures, are removed by a loop filter.
>
> The picture coding apparatus without a loop filter as in MPEG-2 degrades
> coding efficiency (i.e., compression rate) when such film grains appear in
> the picture signal.

Applicant has now provided new claims including independent Claims 26 and 29, both of

which include the following claim elements.

> (A)   outputting a decoded picture by decoding a coded picture included
> in the bitstream;
>
> (B)   outputting a filtered picture by performing a filtering process on
> the decoded picture;
>
> (C)   extracting filtering application information from the bitstream, the
> filtering application information indicating, on a picture-by-picture basis,
> which one of the decoded picture before the filtering process and the
> decoded picture after the filtering process is outputted for a display
> process; and
>
> (D)   storing, in a memory, the decoded picture after the filtering process
> as a reference picture, and outputting the decoded picture before the
> filtering process in the case where the decoded picture is the reference
> picture and the filtering application information indicates, as the picture
> for the display process, the decoded picture before the filtering process.

With the above structure, the following effects (Effect 1 and Effect 2) can be obtained.

(Effect 1) The above claim elements (C) and (D) make it possible to place a series of restrictions on reference pictures in accordance with filtering application information (for example, a 1-bit flag). Here, the series of restrictions are for storing decoded pictures after a filtering process and for outputting, for a display process, decoded pictures before the filtering process. This makes it possible, for example, to select whether to leave film grains in pictures. Here, these film grains are grains which particularly appear in a movie film, and affect the quality of the images. In addition, these film grains appear on the images in granular form, and are usually removed through the filtering process. Placing the series of restrictions in the bitstream makes it possible to actively leave and select the film grains, and thereby satisfy the desire of a movie aficionado .

(Effect 2) It is possible to improve the coding efficiency of a bitstream irrespective of whether film grains are left. The present picture decoding method is naturally adapted in local decoding within a coding apparatus which generates a bitstream. Since the filtered decoded pictures without film grains are stored in a memory as reference pictures in the above (D), it is possible to improve the coding efficiency.

In contrast, AAPA fails to disclose or suggest elements (C) and (D) involving the placement of the series of restrictions on reference pictures in accordance with the filtering application information (for example, a 1-bit flag). In addition, AAPA fails to address the technical problem of actively leaving film grains, and thus cannot provide the Effects 1 and 2.

As described above, the present invention makes it possible to solve a technical problem which cannot be solved by the teachings of AAPA, and to provide the Effects 1 and 2 which

cannot be obtained from AAPA. Thus, the Applicant believes that even a person skilled in the art would not have been able to arrive at the present invention based on AAPA.

> "'[T]he dispositive question regarding anticipation is whether one skilled in the art would reasonably understand or infer from the prior art reference's teaching that every claim [limitation] was disclosed in that single reference.' *Dayco Prods., Inc. v. Total Containment, Inc.*, F.3d 1358, 1368 (Fed. Cir. 2003).
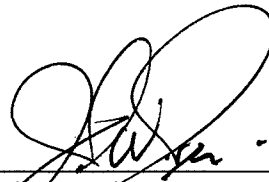
Applicant has amended the claims so that the anticipation is not an issue, and it is respectfully submitted that our present invention would not be obvious over the AAPA alone or in combination with the secondary references that have been cited of interest in the prosecution of this case.

Accordingly, it is believed that the present case is in condition for allowance and an early notification of the same is requested.

If the Examiner believes a telephone interview will further the prosecution of this case, the undersigned attorney can be contacted at the listed phone number.

Very truly yours,

SNELL & WILMER L.L.P.

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